

DEFENSE INFORMATION SYSTEMS AGENCY

P. O. BOX 549 FORT MEADE, MARYLAND 20755-0549

 $\begin{array}{l} {\scriptstyle \text{IN REPLY} \\ \text{REFER TO:}} \end{array} \ Joint \ Interoperability \ Test \ Command \ (JTE) \end{array}$

MEMORANDUM FOR DISTRIBUTION

6 Jul 11

SUBJECT: Special Interoperability Test Certification of the Cisco Unity Connection Release 8.0(2) with Private Branch Exchange Internet Protocol Media Gateway (PIMG)

Analog Interface

References: (a) DoD Directive 4630.05, "Interoperability and Supportability of Information Technology (IT) and National Security Systems (NSS)," 5 May 2004

- (b) CJCSI 6212.01E, "Interoperability and Supportability of Information Technology and National Security Systems," 15 December 2008
- (c) through (f), see Enclosure 1
- 1. References (a) and (b) establish the Defense Information Systems Agency (DISA), Joint Interoperability Test Command (JITC), as the responsible organization for interoperability test certification.
- 2. The Cisco Unity Connection Release 8.0(2) with PIMG Analog interface is hereinafter referred to as the System Under Test (SUT). The SUT meets all of its critical interoperability requirements and is certified as interoperable for joint use within the Defense Information System Network (DISN) as a Customer Premise Equipment (CPE) voicemail system. The SUT met the critical interoperability requirements set forth in References (c) using test procedures derived from Reference (d). The SUT was tested with the Avaya Communication Server (CS)2100. Additionally, JITC analysis also determined that the SUT is certified for joint use with any digital switching system on the Unified Capabilities (UC) Approved Product List (APL) that has serial Electronic Industries Alliance (EIA)-232 Simple Message Desk Interface (SMDI) and 2-wire loop start analog interfaces certified. The SUT offers facsimile (fax) and email capabilities; however, these capabilities were not tested and are not covered under this certification. No other configurations, features, or functions, except those cited within this report, are certified by the JITC. This certification expires upon changes that could affect interoperability, but no later than three years from the date the DISA Field Security Operations (FSO) provided a positive Certification and Accreditation (CA) Recommendation.
- 3. This finding is based on interoperability testing, review of the vendor's Letters of Compliance (LoC), and DISA CA Recommendation. Interoperability testing was conducted at JITC's Global Information Grid Network Test Facility, Fort Huachuca, Arizona from 17 through 21 January 2011. Review of the vendor's LOC was completed on 10 May 2011. DISA adjudication of outstanding test discrepancy reports was completed on 10 May 2011. The DISA CA provided a positive DISA CA Recommendation on 16 June 2011 based on the security testing completed by

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DISA-led IA test teams and published in a separate report, Reference (e). Enclosure 2 documents the test results and describes the tested network and system configurations.

4. The Functional Requirements used to evaluate the interoperability of the SUT and the interoperability statuses are indicated in Table 1. This interoperability test status is based on the SUT's ability to meet CPE voicemail system requirements specified in section 5 of Reference (c) verified through JITC testing and/or vendor submission of LoC.

Table 1. SUT Functional Requirements and Interoperability Status

Interface	Critical	Certified	Functional Requirements	Met	UCR Paragraph
TI		Yes	ANSI/TIA/EIA-232-F (C)	Met	5.2.1.2
EIA-232 Serial	No		FCC Part15/Part 68 (R)	Met	5.2.3.2
Scria			DISR compliance as applicable (C)	Met	5.2.3.2
	No	Yes	FCC Part15/Part 68 (R)	Met	5.2.2.3
			DTMF and/or DP out pulsing in accordance with GR-506-CORE (C)	Met	5.2.4.4
2-Wire Analog (GR-506-CORE)			DISR compliance as applicable (C)	Met	5.2.3.2
(GR-500-CORL)			ROUTINE precedence only in accordance with UCR, Section 5.2 (R)	Met	5.2.2.3
			TIA/EIA-470-B (R)	Met	5.2.12.3.5.1
IP (100BaseT)	No	V	Service Class Tagging (R)	Partially Met ¹	5.2.12.8.2.9
(IEEE 802.3u)	INO	Yes	IEEE 802.3 (C)	Met	5.2.3.2
Security Yes Yes		Yes	Security (R)	See note 2.	3.2.3, 3.2.5

NOTES:

² Security is tested by DISA-led Information Assurance test teams and published in a separate report, Reference (e).

LEGEND: 100BaseT 802.3u ANSI C DISA DISR	100 Mbps (Baseband Operation, Twisted Pair) Ethernet Standard for carrier sense multiple access with collision detection at 100 Mbps American National Standards Institute Conditional Defense Information Systems Agency Department of Defense Information Technology Standards Registry	FCC GR GR-506 IEEE IP LSSGR	Federal Communications Commission Generic Requirement LSSGR: Signaling for Analog Interfaces Institute of Electrical and Electronics Engineers Internet Protocol Local Access and Transport Area (LATA) Switching Systems Generic Requirements Megabits per second
DP DSCP DTMF EIA EIA-232-F	Dial Pulse Differentiated Services Code Point Dual Tone Multi-Frequency Electronic Industries Alliance Standard for defining the mechanical and electrical characteristics for connecting Data Terminal Equipment (DTE) and Data Circuit-terminating Equipment (DCE) data communications devices	R SUT TDM TIA	Required System Under Test Time Division Multiplexing Telecommunications Industry Association Performance and Compatibility Requirements for Telephone Sets with Loop Signaling Unified Capabilities Requirements

5. No detailed test report was developed in accordance with the Program Manager's request. JITC distributes interoperability information via the JITC Electronic Report Distribution (ERD) system, which uses Unclassified-But-Sensitive Internet Protocol Router Network (NIPRNet) email. More comprehensive interoperability status information is available via the JITC System

¹ The SUT met the Service Class Tagging interoperability Requirements in accordance with the UCR section 5.2.12.8.2.9 with the following exceptions: All Session Initiation Protocol (SIP) signaling packets from the Unity Connection Server were marked with a DSCP value of 24 decimal. The required DSCP value is 40 Decimal. Additionally, the Unity Connection Server can not assign a DSCP value of 0-63 for signaling packets. DISA has adjudicated this discrepancy as having a minor operational impact.

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Tracking Program (STP). The STP is accessible by .mil/gov users on the NIPRNet at https://stp.fhu.disa.mil. Test reports, lessons learned, and related testing documents and references are on the JITC Joint Interoperability Tool (JIT) at https://jit.fhu.disa.mil (NIPRNet). Information related to DSN testing is on the Telecom Switched Services Interoperability (TSSI) website at http://jitc.fhu.disa.mil/tssi. Due to the sensitivity of the information, the Information Assurance Accreditation Package (IAAP) that contains the approved configuration and deployment guide must be requested directly through government civilian or uniformed military personnel from the Unified Capabilities Certification Office (UCCO), e-mail: ucco@disa.mil.

6. The JITC point of contact is Mr. Edward Mellon, DSN 879-5159, commercial (520) 538-5159, FAX DSN 879-4347, or e-mail to edward.mellon@disa.mil. The JITC's mailing address is P.O. Box 12798, Fort Huachuca, AZ 85670-2798. The tracking number for the SUT is 1027701.

FOR THE COMMANDER:

2 Enclosures a/s

for BRADLEY A. CLARK

Chief

Battlespace Communications

Distribution (electronic mail):

Joint Staff J-6

Joint Interoperability Test Command, Liaison, TE3/JT1

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DOT&E, Net-Centric Systems and Naval Warfare

U.S. Coast Guard, CG-64

Defense Intelligence Agency

National Security Agency, DT

Defense Information Systems Agency, TEMC

Office of Assistant Secretary of Defense (NII)/DOD CIO

U.S. Joint Forces Command, Net-Centric Integration, Communication, and Capabilities Division, J68

Defense Information Systems Agency, GS23

ADDITIONAL REFERENCES

- (c) Office of the Assistant Secretary of Defense, "Department of Defense Unified Capabilities Requirements 2008 Change 1," 22 January 2010.
- (d) Joint Interoperability Test Command, "Defense Switched Network Generic Switch Test Plan (GSTP), Change 2," 2 October 2006
- (e) Joint Interoperability Test Command, "Information Assurance (IA) Assessment of Cisco Unity Connection Release (Rel.) 8.0 with (w)/ Private Branch Exchange Internet Protocol Media Gateway-Analog (PIMG-A) (Tracking Number 1027701)," 21June 2011

CERTIFICATION TESTING SUMMARY

- **1. SYSTEM TITLE.** Cisco Unity Connection Release 8.0(2) with Private Branch Exchange Internet Protocol Media Gateway (PIMG) Analog Interface is hereinafter referred to as the System Under Test (SUT).
- **2. PROPONENT.** Missile Defense Agency (MDA)
- **3. PROGRAM MANAGER.** Mr. Stuart Strong, MDA/DXCA, 730 Irwin Avenue, Schriever Air Force Base, Colorado 80912, e-mail: stuart.strong@mda.mil.
- 4. TESTER. Joint Interoperability Test Command (JITC), Fort Huachuca, Arizona.
- 5. SYSTEM UNDER TEST DESCRIPTION. The SUT is a Voice Messaging System that offers Unified Communications capabilities through integration with Microsoft Outlook with Cisco ViewMail on Windows XP and Vista. The SUT is capable of interfacing DSN switching system with two-wire analog loop start lines via the PIMG to provide Voice Messaging. Survivability features included in the SUT server platforms may include Redundant Array of Independent Disks (RAID) hard-drive arrays which support hot-swapping of drives, dual power supplies, and Network Interface Card (NIC) teaming. Microsoft Exchange may be installed on the same system as Unity Connection for Voicemail or Unity Connection can be integrated into an existing Microsoft Exchange infrastructure for Unified Messaging. The SUT utilizes a webbased interface to maintain the necessary information needed to provide messaging services to authorized mailbox owners as well as system maintenance. The information includes mailbox associations, system and messaging service settings, maintenance and diagnostics. The SUT offers facsimile (fax) and e-mail capabilities; however, these capabilities were not tested and are not covered under this certification. Management of the SUT is though a site-provided, Secure Technical Implementation Guide (STIG)compliant workstation.
- **6. OPERATIONAL ARCHITECTURE.** The Unified Capabilities Requirements (UCR) DSN architecture in Figure 2-1 depicts the relationship of the SUT to the DSN switches.

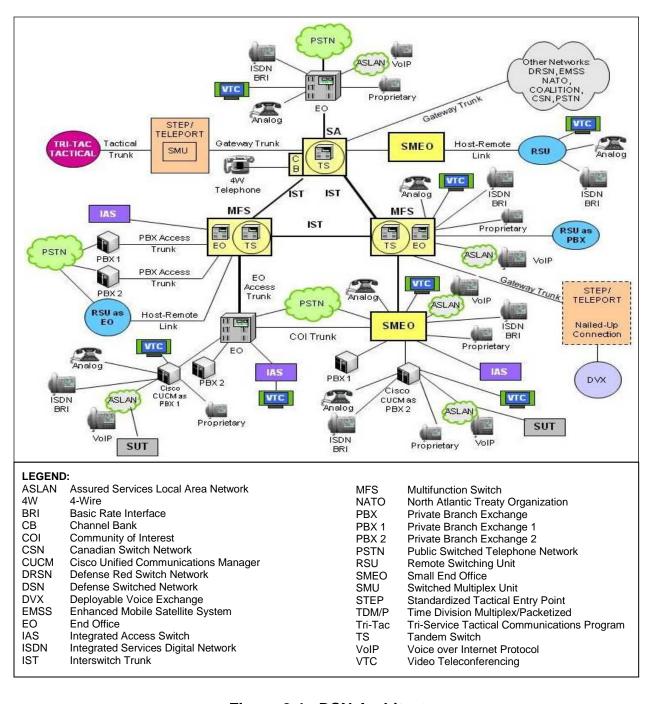


Figure 2-1. DSN Architecture

7. REQUIRED SYSTEM INTERFACES. Requirements specific to the SUT and interoperability results are listed in Table 2-1. These requirements are derived from the UCR Interface and Functional Requirements and were verified through JITC testing. The specific SUT applications certified on each interface are depicted in Table 2-1.

Table 2-1. SUT Functional Requirements and Interoperability Status

Interface	Critical	Certified	Functional Requirements	Met	UCR Paragraph
E14 000		Yes	ANSI/TIA/EIA-232-F (C)	Met	5.2.1.2
EIA-232 Serial	No		FCC Part15/Part 68 (R)	Met	5.2.3.2
Jenai			DISR compliance as applicable (C)	Met	5.2.3.2
	No	Yes	FCC Part15/Part 68 (R)	Met	5.2.2.3
0.14" A 1			DTMF and/or DP out pulsing in accordance with GR-506-CORE (C)	Met	5.2.4.4
2-Wire Analog (GR-506-CORE)			DISR compliance as applicable (C)	Met	5.2.3.2
(GR-300-CORL)			ROUTINE precedence only in accordance with UCR, Section 5.2 (R)	Met	5.2.2.3
			TIA/EIA-470-B (R)	Met	5.2.12.3.5.1
IP (100BaseT)	No	Yes	Service Class Tagging (R)	Partially Met ¹	5.2.12.8.2.9
(IEEE 802.3u)			IEEE 802.3 (C)	Met	5.2.3.2
Security	Yes	Yes	Security (R)	See note 2.	3.2.3, 3.2.5

NOTES:

- 1 The SUT met the Service Class Tagging interoperability Requirements in accordance with the UCR section 5.2.12.8.2.9 with the following exceptions: All Session Initiation Protocol (SIP) signaling packets from the Unity Connection Server were marked with a DSCP value of 24 decimal. The required DSCP value is 40 Decimal. Additionally, the Unity Connection Server can not assign a DSCP value of 0-63 for signaling packets. DISA has adjudicated this discrepancy as having a minor operational impact.
- 2 Security is tested by DISA-led Information Assurance test teams and published in a separate report, Reference (e).

L	Ε	G	Ε	N	D:

ı	LEGEND:			
l	100BaseT	100 Mbps (Baseband Operation, Twisted Pair)	FCC	Federal Communications Commission
ı		Ethernet	GR	Generic Requirement
ı	802.3u	Standard for carrier sense multiple access with	GR-506	LSSGR: Signaling for Analog Interfaces
ı		collision detection at 100 Mbps	IEEE	Institute of Electrical and Electronics
l	ANSI	American National Standards Institute		Engineers
ı	С	Conditional	IP	Internet Protocol
l	DISA	Defense Information Systems Agency	LSSGR	Local Access and Transport Area (LATA)
ı	DISR	Department of Defense Information Technology		Switching Systems Generic Requirements
ı		Standards Registry	Mbps	Megabits per second
ı	DP	Dial Pulse	R	Required
ı	DSCP	Differentiated Services Code Point	SUT	System Under Test
ı	DTMF	Dual Tone Multi-Frequency	TDM	Time Division Multiplexing
ı	EIA	Electronic Industries Alliance	TIA	Telecommunications Industry Association
ı	EIA-232-F	Standard for defining the mechanical and electrical	TIA/EIA-470-B	Performance and Compatibility Requirements
		characteristics for connecting Data Terminal		for Telephone Sets with Loop Signaling
		Equipment (DTE) and Data Circuit-terminating	UCR	Unified Capabilities Requirements
		Equipment (DCE) data communications devices		•
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8. TEST NETWORK DESCRIPTION. The SUT was tested at JITC's Global Information Grid Network Test Facility in a manner and configuration similar to that of the DSN operational environment. Testing the system's required functions and features was conducted using the test configurations depicted in Figure 2-2.

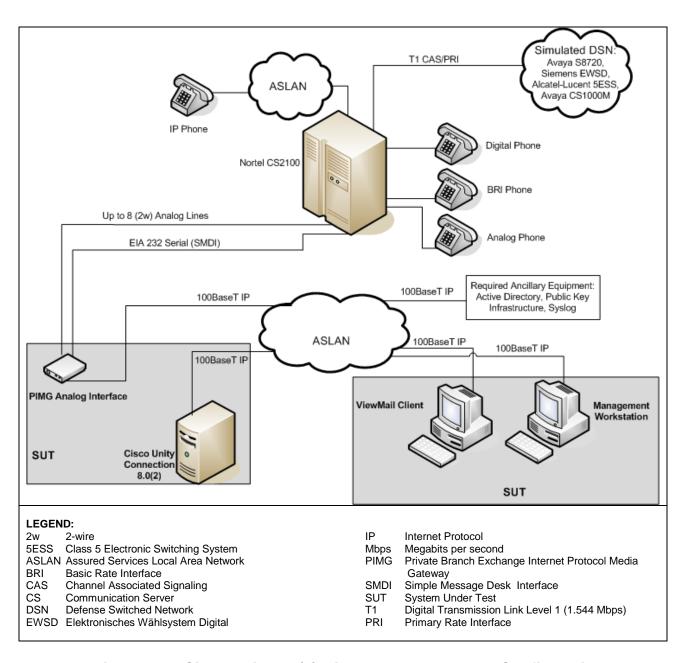


Figure 2-2. Cisco Unity 8.0(2) with PIMG Analog Test Configuration

9. SYSTEM CONFIGURATIONS. Table 2-2 provides the system configurations, hardware and software components tested with the SUT. The SUT was tested in an operationally realistic environment to determine interoperability with a complement of DSN switches noted in Table 2-2. The DSN switches listed in Table 2-2 only depict the tested configuration. Table 2-2 is not intended to identify the only switch software releases that are certified with the SUT. The SUT is certified specifically with switching systems listed on the UC APL that are certified for voicemail with the serial Electronic Industries Alliance (EIA)-232 Simple Message Desk Interface (SMDI) and 2-wire loop start analog interfaces.

Table 2-2. Tested System Configurations

System Name	Software Release				
Avaya S8720) (R014x.00.2.731.7: Super Patch 14419)			
Siemens EWSD	19d with	Patch Set 46			
Avaya CS2100		Enterprise (SE) 09.1			
Alcatel-Lucent 5ESS	5E16.2 Broadcast Warning Message (BWM) 09-0002				
Avaya CS1000M	5.0				
,	Active Directory				
Required Ancillary		ey Infrastructure			
Equipment	SysLog				
Alcatel-Lucent Simple Message System Interface ED5D885-30, G40	Release 2.0 (Provides the SMDI interface)				
SUT	Hardware	Software/Firmware			
		Cisco Unity Connection 8.0(2)			
		Red Hat Enterprise AS Rel. 4.			
		Kernel 2.6 2.6.9-89.elsmp			
	He'ffeet Occasion for a Courtery CO40 M4	IBM Informix Dynamic Server v10.00.UC9X4			
	Unified Computing System C210-M1	Apache Tomcat 6.0.29			
		Open SSL V.9.7a			
0. 11.50		Java 1.6.0_22-b04			
Cisco Unity Connection		Real-Time Monitoring Tool 8.1			
Release 8.0(2) with Private Branch Exchange		ESXi 4.0.0 Build 208167			
Internet Protocol Media Gateway (PIMG) Analog Interface (SUT)	Private Branch Exchange Internet Protocol Media Gateway	6.0SU3.2			
(501)	Management Workstation (Site-provided) STIG-compliant, Common Access Card (CAC)-enabled May be on either an XP or Vista platform	Windows XP SP3 or Windows Vista SP2			
	Client Workstation (Site-provided)	Windows XP SP3 or Windows Vista SP2			
	May be on either an XP or Vista platform	MS Outlook 2010			
	iviay be on enner an Ar or vista platform	View Mail 8.5.3.186			
Telephones Types Tested with the SUT	Hardware	Software/Firmware			
Cisco IP Phones	CP7940G	Ver: 8.0(2)(4.0) App: P00308010200 Boot Load: CP-7940G PC0303010200			
Cisco ir Filolies	CP7970G	SCCP9.0.2SR1 Boot Load: 7970-64054100.BIN			
	CP7971G GE	SCCP9.0.2SR1 Boot Load: 7970-020706.BIN			
Analog	Panasonic KX-TS15-W (Analog)	Not Applicable			
7 11 31 0 9	Panasonic KX-T2355 (Analog)	Not Applicable			
ISDN BRI	Siemens Optiset ISDN BRI	Not Applicable			
105.115.11	Avaya M5317T	5.0 1999			

Table 2-2. Tested System Configurations (continued)

LEGEND:

5ESS Class 5 Electronic Switching System MCS Media Convergence Server

APL Approved Products List PIMG Private Branch Exchange Internet Protocol Media
BRI Basic Rate Interface Gateway

BRI Basic Rate Interface Gateway
CCM Cisco CallManager SG Single Group

CS Communication Server SMDI Simple Message Desk Interface

DSN Defense Switched Network SP Service Pack
EWSD Elektronisches Wählsystem Digital SUT System Under Test

ISDN Integrated Services Digital Network

10. TEST LIMITATIONS. None.

11. TEST RESULTS

a. Discussion

- (1) Voice mail interaction with Multi-Level Precedence and Preemption (MLPP). The UCR, section 5 states that CPE must meet MLPP requirements. The SUT was tested in accordance with the UCR, section 5.2, which states that precedence levels above ROUTINE shall not be forwarded to voice mail. The SUT was tested to ensure that it properly interacted with MLPP. Intra-switch and inter-switch calls were placed over the network test configuration to subscribers configured on the Cisco Unity Connection and assigned voice mail at different precedence levels with the following results:
- (a) All ROUTINE calls placed to a voice mail subscriber that was busy or did not answer, were properly routed to voice mail.
- (b) All calls above ROUTINE placed to a voice mail subscriber that was busy or did not answer were not routed to voice mail, but instead were diverted to the global default diversion route.
- (2) Differentiated Services Code Point (DSCP). The UCR 2008, Change 2 paragraph 5.3.3.3.2, states that the product shall support the plain text DSCP plan, as shown in Table 5.3.3-1, DSCP Assignments, and the DSCP assignment shall be software configurable for the full range (0-63) to support Deployable deployments that may use a different DSCP plan.
- (a) DSCP tagging. Captures were taken between the SUT PIMG Analog and the Unity Connection. Voice media was sent as International Telecommunication Union Telecommunication Standardization Sector (ITU-T) G.711 packets to and from the PIMG Analog. All ITU-T G.711 packets were 20 milliseconds in size and were correctly tagged with a DSCP value of 46. Voice signaling packets from the PIMG Analog device were properly tagged with a DSCP value of 40, however the voice signaling packets from the Unity Connection server were tagged with a DSCP value of 24 instead of the required value of 40. The PIMG Analog device can assign

any value 0-63 for both signaling and voice packets however the Unity Connection server cannot assign a DSCP value to signaling packets. DISA has adjudicated this discrepancy as having a minor operational impact. The SUT provides the ability to convert a voicemail message recorded by a user in the SUT to Internet Message Access Protocol (IMAP) IP packets transmitted to a PC client in the form of WAV file in an email. Cisco ViewMail for Outlook (VMO) add-in client software allows the PC user to send, listen to, and manage messages directly from their Outlook Inbox. This functionality was tested and the IMAP packets transmitted by the SUT to the PC client were correctly tagged with a DSCP value of 0. The Management Workstation has the ability to assign any value 0-63 and correctly tagged the DSCP value at 16 for operational network management traffic.

- **b. Test Summary.** The SUT meets the critical interoperability requirements for a Customer Premise Equipment voice mail system in accordance with Reference (c). The SUT was tested with the Avaya Communication Server (CS)2100. Additionally, JITC analysis also determined that the SUT is certified for joint use with any digital switching system on the Unified Capabilities (UC) Approved Product List (APL) that has serial Electronic Industries Alliance (EIA)-232 Simple Message Desk Interface (SMDI) and 2-wire loop start analog interfaces certified. The SUT offers facsimile (fax) and e-mail capabilities; however, these capabilities were not tested and are not covered under this certification. No other configurations, features, or functions, except those cited within this report, are certified by the JITC.
- 12. TEST AND ANALYSIS REPORT. No detailed test report was developed in accordance with the Program Manager's request. JITC distributes interoperability information via the JITC Electronic Report Distribution (ERD) system, which uses Unclassified-But-Sensitive Internet Protocol Router Network (NIPRNet) e-mail. More comprehensive interoperability status information is available via the JITC System Tracking Program (STP). The STP is accessible by .mil/gov users on the NIPRNet at https://stp.fhu.disa.mil. Test reports, lessons learned, and related testing documents and references are on the JITC Joint Interoperability Tool (JIT) at http://jit.fhu.disa.mil (NIPRNet). Information related to DSN testing is on the Telecom Switched Services Interoperability (TSSI) website at http://jitc.fhu.disa.mil/tssi. Due to the sensitivity of the information, the Information Assurance Accreditation Package (IAAP) that contains the approved configuration and deployment guide must be requested directly through government civilian or uniformed military personnel from the Unified Capabilities Certification Office (UCCO), e-mail: ucco@disa.mil.